ROTARY

Rotary Tables
Indexers
and Trunnions

TURNING MILLING GRINDING WORKHOLDING ROTARY

www.hardinge.com

HARDINGE GROUP™

More Accuracy, Speed and Flexibility!

The Most Flexible Quick-Change Workholding Concept on the Market…

Hardinge's A2-4 (5C) and A2-5 (16C) spindle nose designs allow quick change between collets, expanding collets, step chucks, 3-jaw chucks and face plates. Common spindle tooling can be shared between the Hardinge Rotary System(s) and a lathe. The gripping is in the spindle, closest to the spindle bearings, unlike surface-mounted adapters used on traditional rotary tables. Multiple workholding options provide alternate gripping solutions for increased precision and capability.

Pages 24-25

800.843.8801 www.shophardinge.com

Hardinge has a large selection of rotary products for all ranges of production. Choose from precision and super-precision systems – single-spindle, multi-spindle and dual-axis configurations…

- Accuracy to ±3 Arc-Sec
- Repeatability to ±2 Arc-Sec
- Rapid positioning speeds
- Reliability
- Zero backlash systems
- Flexibility of workholding tooling
- Fast changeover
- Heavy axial and radial load capacity

5C² Gear-Driven Rotary Indexers

GD5C2 single
GD5C2-02 dual
GD5C2-03 triple
GD5C2-04 quad

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16C² and 3J² Gear-Driven Rotary Indexers

GD16C2 and GD3J2 single
GD16C2-02 and GD3J2-02 dual
GD16C2-03 and GD3J2-03 triple

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160 and 210mm Low-Profile Rotary Tables

GD160LP
GD210LP

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Tilting Dual-Axis Rotary Indexers Single and Multi-Spindle

LPX5C2-01 single
LPX5C2-02 dual
LPX5C2-03 triple
LPX5C2-04 quad
GDX5C2

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Gearless, Direct-Drive, Zero-backlash Rotary Table Indexers

DD100
DD200
DD300

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Plate and Cube Trunnions, Servo Controls, Collet Closers, Tailstocks and Workholding Options

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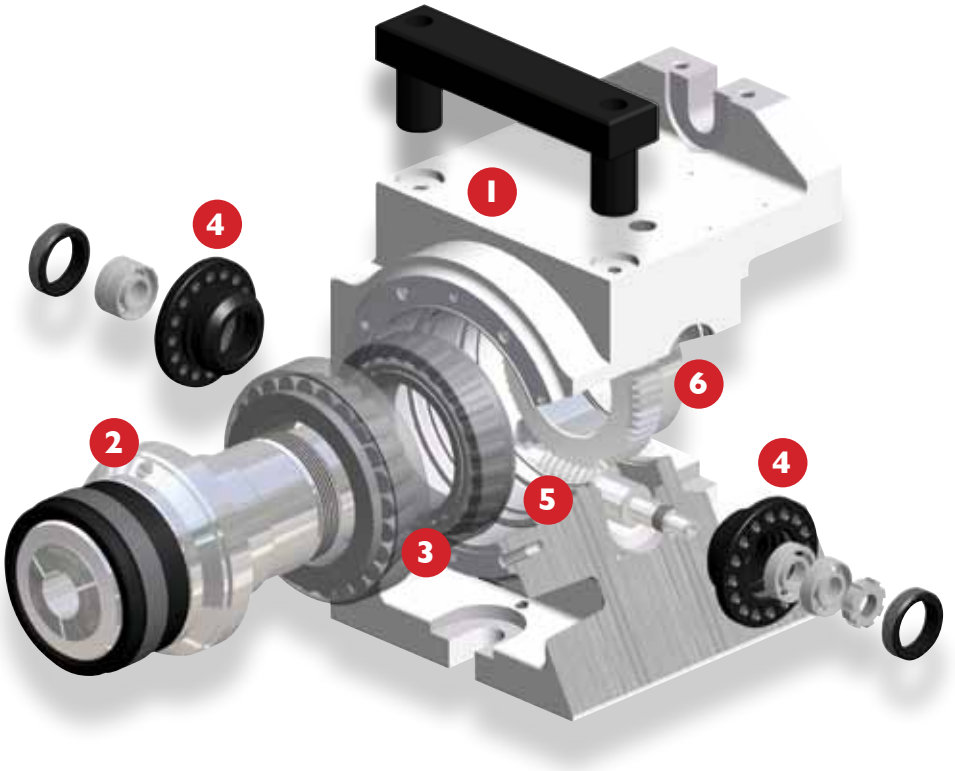
Quality Manufacturing Processes

Hardinge's GD5C2 has more accuracy, more spindle clearance and more thrust & radial load. All rotary products are manufactured in Elmira, New York to strict specifications.

Curved front casting and removable handle for increased spindle clearance and better tool access.

10 arc-sec Repeatability
±25 arc-sec Accuracy
.0002" Max. Runout (.005mm TIR)

Robust, dual-bearing spindle for heavier radial and axial loads.
50-lb (23kg) part weight and 1000-lb (4448N) tailstock thrust per spindle is not a problem – even on a quad unit with tailstocks!



Small body. **INTENSE** soul & character.

Hardinge® next-generation 5C² mechanically outmaneuvers the competition.

1. HOUSING
Machined and bored on a Dixi 280 precision CNC jig boring machine for close tolerance finish dimensions. Foundry castings (made in the USA) provide vibration damping.

2. SPINDLE
Spindle is finish ground on a high-precision Kellenberger® CNC universal grinding machine. All surfaces where bearings and gears are installed are ground in the same setup for maximum accuracy.

3. BEARINGS
High-load, tapered dual roller bearings are used to support heavy radial and axial loads and to provide a longer spindle life.

4. DOUBLE ECCENTRICS
Double eccentrics (not single) provide the finest gear mesh adjustment. Hardinge has lowered the backlash range and improved accuracy overall. Customers can perform future gear wear compensation for extended life and improved accuracy over time.

5. WORM DRIVE SHAFT
Hardened and ground steel worm drive shaft is standard. The process begins on a Hardinge® Super-Precision CNC lathe and the threads are finish ground on a Drake thread grinder. Grind quality of AGMA class 13 is verified on a Wenzel CNC gear inspection machine.

INSPECTION
Final inspection of every unit is performed using a Heidenhain encoder mounted directly on the spindle nose to assure final positioning accuracy and repeatability. Printout of accuracy is shipped with each unit.

6. CROSS AXIS HELICAL GEAR
Hardened & ground steel cross-axis helical gear offers more accuracy and less wear. The process begins on a Hardinge Super-Precision CNC lathe, then hobbed on a Koepfer hobber, with the final finish grind on a Samputensili threaded wheel grinder. Grind quality of AGMA class 13 is verified on a Wenzel CNC gear inspection machine.

SEALING
Hardinge has an extremely thorough seal system to keep coolant out.

MULTIPLE PART SETUPS
Choose from dual, triple and quad units for processing multiple parts to increase output. All spindles are synchronized for aligned part orientation within .0002" (.005mm).

THE EVOLUTION OF THE HARDINGE 5C² ROTARY SYSTEM

1901 Hardinge manufactures the 5C Collet

1940 Hardinge manufactures and introduces the 5C "threaded-nose" spindle

1940's Hardinge manufactures a 5C dividing head

1960's Hardinge manufactures 5C manual indexers using Hardinge's threaded-nose spindle & collet closer design

Collet-ready spindles accept several gripping devices

Hardinge rotary systems accept many styles of standard tooling without an adapter, which is unique in the industry. You can purchase a complete system all tooled up and ready to run your parts. Rely on the spindle tooling experts for the accuracy and repeatability to get the job done.

Zero-backlash Direct-Drive Technology

Hardinge offers direct-drive technology for flexible, high-speed, super-precision parts positioning. Features include rapid bidirectional response, zero backlash and high servo stiffness in a small foot print. Custom-manufacturing is available for two-axis applications.

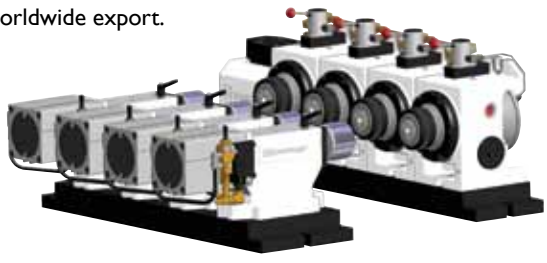
Infrared Upload Capability

Hardinge servo controls have infrared sensor capability for convenient upload or download of programs from a Windows-based Pocket PC.

MADE IN THE U.S.A.

Manufactured in the USA

Hardinge rotary products are manufactured in Elmira, New York to strict specifications and are approved for worldwide export.



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2004

Hardinge manufactures 5C Rotary Systems based on 1960's mechanical design

2007

Hardinge manufactures and introduces the next-generation 5C² Rotary System

4th-Axis Integration…interfacing to a host machine

Direct-Drive DD300 Rotary Table Indexer mounted in a Bridgeport® vertical machining center machining an out-of-round, elliptical part.

Trunnion tailstock application for the DD100 High-Speed Direct-Drive Rotary Positioner.

Spiral milling application on a Bridgeport knee mill using a 5C[2] indexer and manual tailstock.

True 4th-Axis* via the host machine (gear-driven)

INTERFACE OPTION 1

Hardinge gear-driven rotary systems may be connected directly to the host machine and its CNC control. Connecting to the machine's CNC control requires replacing the standard servo motor and cable with a servo motor and cable that is compatible with the host CNC. If the machine is not 4th-axis ready, the machine will need a 4th-axis option and servo amplifier installed. Hardinge has integrated its rotary products with Fanuc, Siemens, Heidenhain, Okuma and Milltronics. Other systems can be supported with the assistance of our engineering team and your machine distributor or manufacturer.

Configured as a 4th-axis, the Hardinge Rotary System operates in a fully interpolated fashion with the other axes of the host machine. This arrangement does not use the Hardinge Servo Control but relies on the capabilities of the machine's CNC control and its motor amplifier. The programming requirements for the rotary system become fully integrated into the main CNC program and is treated as a 4th axis* of the machining center. The system effectively becomes an integral part of the host machine.

4th-Axis* via RS-232 port and interface cable (program resides in the host machine)

INTERFACE OPTION 2

The Hardinge gear-driven rotary systems (rotary unit and servo control) may be connected to the host machine via the RS-232 port. Using this method, the program commands will be resident in the machine's CNC control and sent directly to the Hardinge Servo Control. This interfacing technique requires that the host CNC be capable of communicating programming information over an RS-232 communications port during program execution.

After passing the command information to the servo control, the host CNC will trigger movement to occur via the four-wire interconnecting cable as described in the chart to the left. The cable is provided with a connector for the Hardinge control side and wire terminations for the CNC side. Configuring to the Fanuc control is fully supported. Other control types may be considered upon request. Please note that control systems that do not directly provide the ability to write information to the RS-232 port may require special software by the control builder in order to operate in this fashion. The RS-232 cable is to be provided by the customer. A total of nine control units can be daisy-chained together for program transfer – each with a distinct identifier.

4th-Axis* via CNC interface cable (program resides in the Servo Control)

INTERFACE OPTION 3

In this interface arrangement, the communication that occurs between the Hardinge all-digital servo control and the host CNC is in the simplest form. Logically the host CNC requests that the rotary system control process its next programmed commands and then advise when completed. This requires that the program be stored internally within the Hardinge servo control, which is then asked to execute the commands sequentially as a signal is received from the host CNC control. Typically the START rotary command is prompted by a spare and programmable M-Code. At the completion of the rotary-commanded movement, the unit sends the host CNC a finished signal so that the VMC can proceed with the remainder of its program. The interface cable is provided to connect the host machine to the Hardinge servo control. Note that not all CNC machines have spare relays and M-codes as standard.

A "Y" cable is available for connecting a Haas brush motor indexing head to a specifically-configured Hardinge all-digital Servo Control.

True 4th-Axis* via the host machine (direct-drive)

INTERFACE OPTION 4

Hardinge direct-drive rotary systems incorporate a high-energy, rare-earth torque motor and are generally supported as a true 4th-axis by Fanuc on the higher level controls such as the 21i, 18i, etc. Pole position detect is required. Some machine tool builders use Fanuc controls but do not include support for all Fanuc options in their use of the control. Hardinge Direct-Drive Rotary Systems have also been installed on Heidenhain CNC machines using high voltage drives. Ladder modificaitons may be required. Contact the Hardinge Rotary Systems sales group at 800-843-8801 for more information.

The DD100 and DD200 Direct-Drive Rotary Systems can be used with the all-digital direct-drive servo control or integrated into your CNC manufacturing application as a true 4th-axis. The DD300 is connected via true 4th-axis integration only.

Note: Continuous rotation is not supported on Bridgeport Fanuc controls.

Interface Cable
for Options #2 and #3

Function
Wiring to the host CNC
Cycle Start command to indexer via M-code output, relay (pins 3 and 4 of Hardinge connector)
Spare M-code output and associated relay
24 volt supply (pin 1 of Hardinge connector)
To power supply
M-code finish signal (pin 2 of Hardinge connector)
Spare M-code input

*4th Axis is a generalized term referring to an additional axis that can be integrated into the current X, Y and Z axes machining center configuration.

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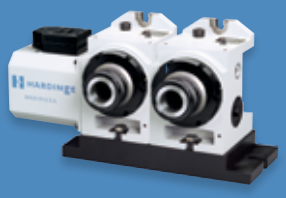
5C² Rotary Indexers



The 5C² Rotary System is based on a long history of Hardinge 5C spindle and manual indexer designs. Over 60 years of Hardinge-engineered and proven mechanical elements guarantee an accurate, repeatable, reliable and flexible product.

Standard Features

- Curved front casting and removable handle for increased spindle clearance and better tool access
- Rapid indexing speed up to 360° per second
- ±5 arc-sec Repeatability
- ±25 arc sec Accuracy
- .0002" (.005mm) Maximum runout (TIR)
- Robust, dual-bearing spindle accommodates heavy axial and radial loads with the ability to run a triple or quad unit with tailstocks
- Brushless motor
- Industry compatible – same spindle centerline, foot print and tool clearance as previous Hardinge products and other US-made brands for direct replacement
- Single, dual, triple and quad spindle configurations
- Operate with the Hardinge all-digital servo control or interface to your machine
- Uses standard 5C collets, Sure-Grip® expanding collets, step chucks and manual jaw chucks

Options

- Collet closers – manual, pneumatic fail-safe through-hole and pneumatic high-force
- Tailstocks and plate trunnions
- Quill Switch for Bridgeport® knee mill to automate the indexing process
- Manual drawbar for each spindle for multi-spindle units
- Preset tailstock and indexer combinations – self-contained units mounted on a subplate for easy placement on and off the machine table to maintain factory tolerances
- Complete array of Hardinge spindle tooling

Preset Tailstock and Rotary Combinations

SINGLE: Pneumatic Tailstock with valve, Pneumatic Rotary Unit, Double Mounting Plate and Servo Control

DUAL: Two Pneumatic Tailstocks with valving, Dual-unit Pneumatic Rotary Unit, Double Mounting Plate and Servo Control

SERVO CONTROL / PROGRAMMING	
Servo Model	Standard Servo
Storage - Number of programs/steps	up to 50/1000
RS-232 Interface	YES
Text Display	multiple lines
Infrared Upload/Download	YES
Baud Rate Capacity	up to 56K
SPINDLE	
Runout Maximum (TIR)	0.0002" (.005)
Backlash	40 arc-sec
Speed	0.001 to 360° per sec
Maximum RPM Rapid Min-1	60
Load Support – max. part weight	Dual Bearing 50 lb / 23 kg
Spindle Type	$2^{3}/_{16}$ – 10 threaded nose
Collets	Standard 5C
Spindle center to base	4.000" ± 0.001 (101.6 ±.0254)
POSITIONING	
Accuracy (arc-sec)	±25 arc-sec
Repeatability	±5 arc-sec
Resolution (degree)	0.001
Max Rotation/Step (degree) 7	9999.99
Gear Diameter	2.8" (71.1)
MOTOR	
Type (DC servo)	0.78hp / 0.58KW
Torque at Spindle	54 ft-lb / 73 Nm
Duty Cycle	90% at full speed
OPERATING SPECIFICATIONS	
Gear Ratio (worm & gear)	60:1
Operating Temp. (maximum ambient)	120°F / 49°C
Power Requirements (VAC)	115 +/- 5% @ 10 amps
Max Air Pressure using High-Force Collet Closer	120 psi / 8.3 bar
Max Air Pressure using Fail-Safe Collet Closer	85 psi / 5.8 bar
WEIGHT	
Single Indexer	55 lb / 25 kg
Dual Indexer	119 lb / 54 kg
Triple Indexer	179 lb / 81 kg
Quad Indexer	240 lb / 109 kg
Control	10 lb / 4.5 kg

Note: 7 – continuous rotation available

GD5C2
GD5C2-02
GD5C2-03
GD5C2-04

Workholding Capacities

Collets – Round (max. capacity)	$1^{1}/_{16}$" (26.98)
Collets – Hex (max. capacity)	$^{29}/_{32}$" (23.01)
Collets – Square (max. capacity)	$^{3}/_{4}$" (19.05)
Step Chucks – Regular Depth	up to 6" (152.4)
Step Chucks – Extra Depth	up to 6" (152.4)
3-Jaw Chuck	5" (127)
3-Jaw Chuck	6" (152.4)
Sure-Grip® Expanding Collets	$^{1}/_{8}$" - 3" (3.17 - 76.2)
Fixture Plate – Spindle Mount	3" (76.2)
Fixture Plate – Spindle Mount	5" (127)
Fixture Plate – Collet Style	$3^{3}/_{8}$" (85.72)
Fixture Plate – Collet Style	$4^{3}/_{8}$" (111.12)
Slotted Face Plate (diameter)	7" (178)
Collet Stops for part positioning	YES

Slotted face plates can be used for "light duty" off-center work only.

Bridgeport Knee Mill Remote Quill Switch

A remote quill switch is available for use with manual Bridgeport® mills. When the quill handle is retracted, it touches a micro switch for automatic indexing, eliminating the need to push the start button on the servo control. The bracket and interface cable are included.

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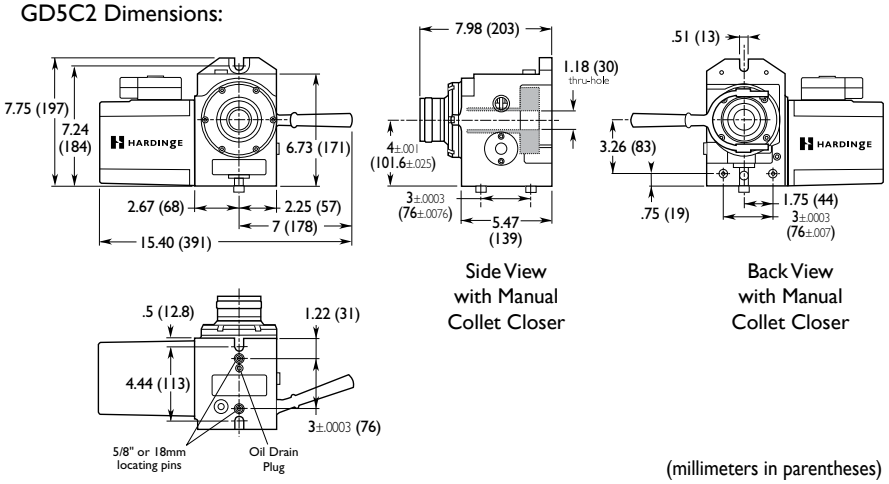
GD5C2 Dimensions:



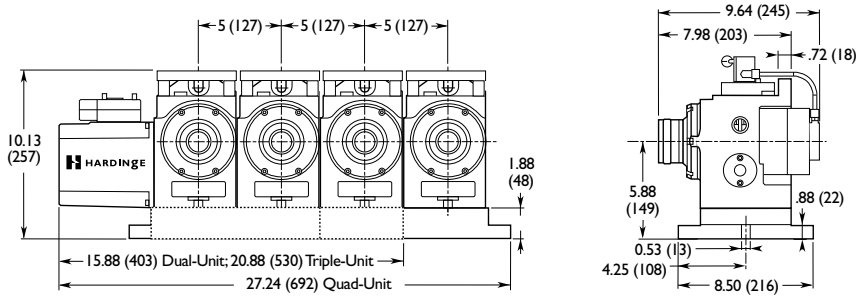
Side View with Manual Collet Closer

Back View with Manual Collet Closer

Front and Bottom Views

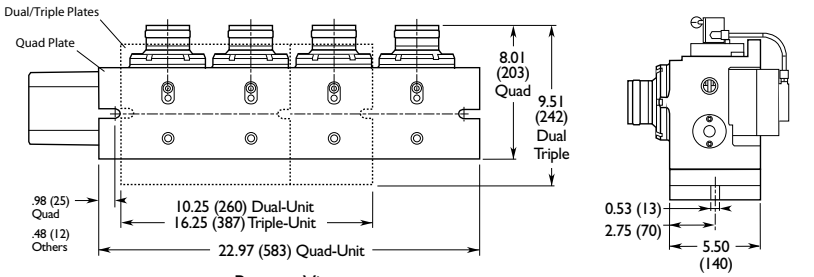
(millimeters in parentheses)

GD5C2-02, -03 and -04 Dimensions:



Front View

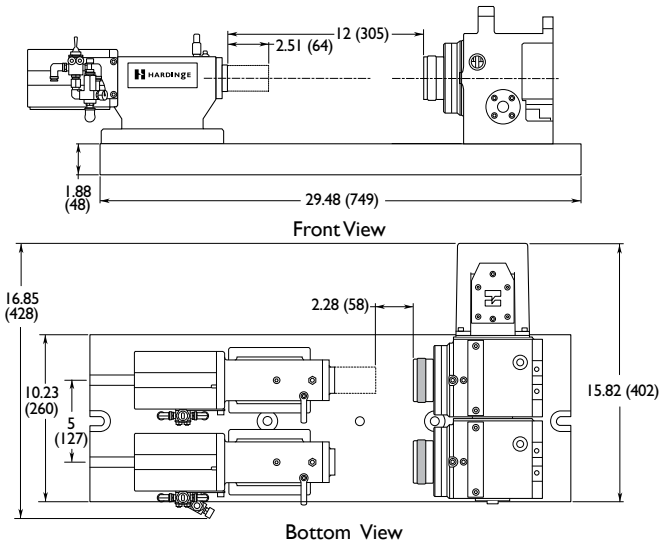
Dual/Triple Side View with Pneumatic High-Force Collet Closer



Bottom View

Quad Side View with Pneumatic High-Force Collet Closer

Preset Tailstock and Indexer Dimensions:



Front View

Bottom View

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16C² and 3J² Rotary Table Indexers

Hardinge's world-renowned collet-ready A2-5 spindle is the heart of the system. The same accuracy, precision and reliability built into the Hardinge lathe extends to a large capacity rotary indexer. A variety of standard 16C or 3J spindle tooling will mount directly in or on the spindle without the use of an adapter. Common spindle tooling can now be shared between a rotary unit and a lathe.

Slotted faceplate sold separately.

Standard Features

- A2-5 16C or 3J spindle accepts standard collets, Sure-Grip® expanding collets, step chucks, fixture plates and power chucks
- Typical part handling of 5 x 7" (127 x 178) parts
- Rapid indexing speed up to 300° per second
- ±5 arc-sec Repeatability
- ±15 arc sec Accuracy
- .0002" (.005mm) Maximum runout (TIR)
- Robust, dual-bearing spindle accommodates heavy axial and radial loads with the ability to run a dual or triple unit with tailstocks
- Spindle clamp eliminates slippage when performing heavy off-center drilling
- Pneumatic collet closer provides 3987-pound (1808kg) draw bar pull at 100psi
- 6" (152.4) centerline to base
- .6248" (15.87) total drawbar travel suitable for 3-jaw power chucks
- Through-hole: 16C² - 1.624" (41.25), 3J² - 1.75" (4.45)
- Performs spiral, arc and linear milling as well as standard indexing operations
- Single, dual and triple spindle configurations

Options

- 5C adapter available for small part processing – Order part no. CJ 00002835CA
- Tailstocks, plate and cube trunnions
- Complete array of Hardinge spindle tooling

SERVO CONTROL / PROGRAMMING	
Servo Model	Enhanced Servo
Storage - Number of programs/steps	up to 50/1000
RS-232 Interface	YES
Text Display	multiple lines
Infrared Upload/Download	YES
Baud Rate Capacity	up to 56K
SPINDLE	
Runout Maximum (TIR)	0.0002" (.005)
Backlash	40 arc-sec
Speed	0.001 to 300° per sec
Maximum RPM Rapid Min-1	50
Load Support Maximum part weight	Dual Angular Contact Bearing 150 lb / 68 kg
Spindle Type	A2-5
Collets	Standard 16C / Standard 3J
Spindle center to base	6.000" ± 0.001 (152.4 ±.0254)
POSITIONING	
Accuracy [6]	±15 arc-sec
Repeatability	±5 arc-sec
Resolution (degree)	0.001
Max Rotation/Step (degree) [7]	9999.99
Gear Diameter (inch/mm)	6.2 (157)
MOTOR	
Type (DC servo)	0.78 hp / 0.58kW
Clamping Torque [1]	175 ft-lb / 237 Nm
Torque at Spindle	70 ft-lb / 95 Nm
Duty Cycle	90% at full speed
OPERATING SPECIFICATIONS	
Gear Ratio (worm & gear)	60:1
Operating Temp. (maximum ambient)	120°F/49°C
Power Requirements (VAC)	115 +/- 5% @ 10 amps
Maximum Air Pressure	120 psi / 8.3 bar
Minimum Air Pressure	85 psi / 5.8 bar
WEIGHT	
Single Indexer	200 lb / 90.7 kg
Dual Indexer	520 lb / 235.8 kg
Triple Indexer	627 lb / 284.4 kg
Control	9.54 lb / 4.34 kg

Notes: 1 – maximum torque applied before slipping occurs
6 – accuracies can be improved with electronic compensation
7 – continuous rotation available

SINGLE	GD16C2	GD3J2
DUAL	GD16C2-02	GD3J2-02
TRIPLE	GD16C2-03	GD3J2-03

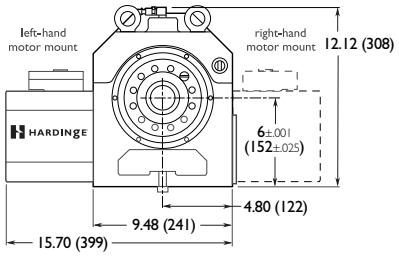
Workholding Capacities 16C²

Collets – Round (max. capacity)	1 5/8" (41.27)
Collets – Hex (max. capacity)	1 13/32" (35.71)
Collets – Square (max. capacity)	1 9/64" (28.97)
Step Chucks – Regular Depth	up to 6" (152.4)
Step Chucks – Extra Depth	up to 6" (152.4)
FlexC Collet System - Style D	2 9/16" (65.00)
3-Jaw Chucks (diameter)	5", 6", 8"
Sure-Grip® Expanding Collets	
Collet Style	1/2" - 4" (12.70 - 101.6)
Spindle Style	1/8" - 4" (3.17 - 101.6)
Fixture Plates	
Spindle Mount	5 1/2" (139.70)
Spindle Mount	8 7/8" (225.42)
Collet Style	6 3/8" (161.92)
Slotted Face Plate	8.85" (225)
Slotted Face Plate	10" (254)
Collet Stops for part positioning	YES

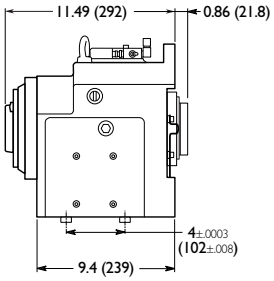
Workholding Capacities 3J²

Collets – Round (max. capacity)	1 3/4" (44.45)
Collets – Hex (max. capacity)	1 17/32" (38.89)
Collets – Square (max. capacity)	1 1/4" (31.75)
Step Chucks – Regular Depth	up to 6" (152.4)
FlexC Collet System - Style D	2 9/16" (65.00)
3-Jaw Chucks	5", 6"
Sure-Grip® Expanding Collets	
Collet Style	1/2" - 4" (12.70 - 101.6)
Spindle Style	1/8" - 4" (3.17 - 101.6)
Fixture Plates	
Spindle Mount	5 1/2" (139.70)
Spindle Mount	8 7/8" (225.42)
Slotted Face Plate	8.85" (225)
Slotted Face Plate	10" (254)
Collet Stops for part positioning	YES

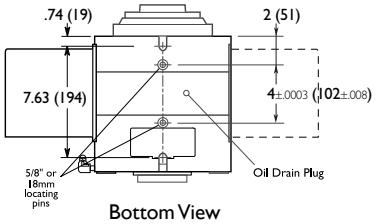
GD16C2 and GD3J2 Dimensions:



Front View

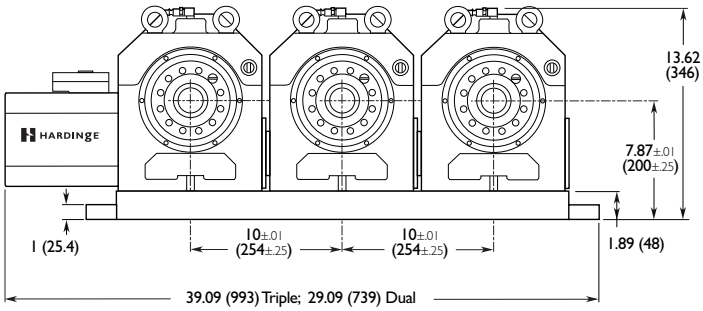


Side View

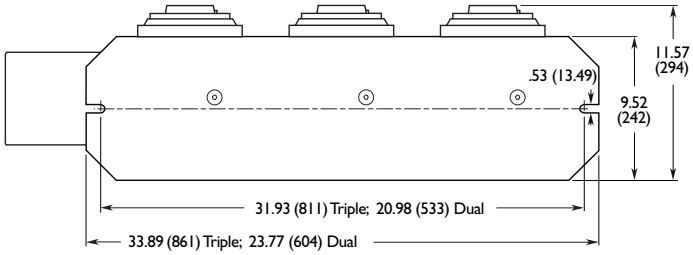


Bottom View

GD16C2-02, -03, GD3J2-02 and -03 Dimensions:



Front View



Bottom View

Top view of 16C² Rotary Indexer – Configure for either left- or right-hand application.

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160 and 210mm Low-Profile Rotary Tables

Sleek, fast and accurate. Engineered to support heavy loads and high-force cutting applications while maintaining accuracy over a long life. Fast clamp and release in milliseconds gives you increased parts-per-hour. Hardinge rotary tables have collet-ready spindles for increased part gripping options.

Face plate included

Standard Features

- 160 and 210mm slotted face plates are precision ground on a Kellenberger® grinding machine
- A2-4 (GD160LP) and A2-5 (GD210LP) extended-nose spindles accept collets, expanding collets, step chucks, manual chucks, power chucks and slotted face plates
- Built-in clamp to handle off-center drilling, cross-axis milling and other high-force cutting applications
- Fast clamp and release in milliseconds for increased parts-per-hour
- Hardened steel worm and hardened steel worm gear for long life and continued accuracy
- Double eccentric design for finest possible factory gear mesh
- Left- or right-hand motor mount
- Use with all-digital servo control on most brands of machines, or as 4th-axis (Fanuc, Siemens, Haas, Heidenhain)

Extended-nose spindle design provides optimum clearance.

Options

- Pneumatic Collet Closer (draw bar force at 80 psi)

  GD160LP – 1850 lb / 835 kg
  GD210LP – 3191 lb / 1440 kg
- GD210LP available with or without collet-ready spindle
- Tailstocks, plate and cube trunnions (GD160LP plate trunnion only)
- Complete array of Hardinge spindle tooling

	GD160LP	GD210LP
SERVO CONTROL / PROGRAMMING		
Servo Model	Standard Servo	
Storage - Number of programs/steps	up to 50/1000	
RS-232 Interface	YES	
Text Display	multiple lines	
Infrared Upload/Download	YES	
Baud Rate Capacity	up to 56K	
SPINDLE		
Runout Maximum (TIR)	0.0002" (.005)	
Backlash	40 arc-sec	
Speed	0.001 to 240° per sec	
Maximum RPM Rapid Min-1	40	
Load Support Maximum part weight	Dual Bearing 100 lb / 45 kg	Dual Bearing 220 lb / 100kg
Spindle Type	A2-4	A2-5
Table Diameter	6.299" (160)	8.267" (210)
Thru Diameter Face Plate (maximum)	1" or 25mm choice	2" or 50mm choice
Thru Dia. Opt. Collet Closer (max)	1.08" (27.4)	1.62" (41.27)
Width of T-slot	.44" (11.2)	.57" (14.4)
Collets	Standard 5C	Standard 16C
Spindle center to base	5.000" ± 0.001 (127 ±.0254)	6.000" ± 0.001 (152.4 ±.0254)
POSITIONING		
Accuracy [6]	±20 arc-sec	±15 arc-sec
Repeatability	±5 arc-sec	
Resolution (degree)	0.001	
Max Rotation/Step (degree) [7]	9999.99	
Gear Diameter (inch/mm)	3.7 (94)	6.2 (157)
MOTOR		
Type (DC servo)	0.78 hp / 0.58kW	2.0 hp / 1.50 kW
Clamping Torque [2] (pneumatic)	150 ft-lb / 203 Nm	275 ft-lb / 373 Nm
Torque [3] at Spindle	73 ft-lb / 99 Nm	90 ft-lb / 122 Nm
Duty Cycle	90% at full speed	
OPERATING SPECIFICATIONS		
Gear Ratio (worm, gear & timing belt)	90:1	
Operating Temp. (maximum ambient)	120°F/49°C	
Power Requirements (VAC)	115 +/- 5% @ 10 amps	
Maximum Air Pressure	100 psi / 6.9 bar	
Minimum Air Pressure	85 psi / 5.8 bar	
WEIGHT		
Rotary Table	120 lb / 57 kg	200 lb / 90.7 kg
Control	9.54 lb / 4.34 kg	

Notes: 2 – maximum torque applied before slipping occurs
3 – from standard GE Fanuc H104 amplifier (results vary when using servo control box or 220v power source)
6 – accuracies can be improved with electronic compensation
7 – continuous rotation available

GD160LP
GD210LP

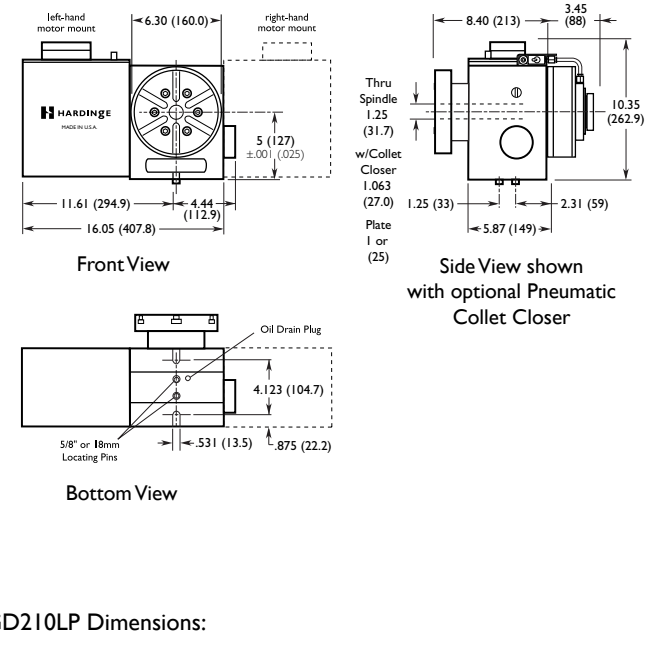
Workholding Capacities
GD160LP

Collets – Round (max. capacity)	1 1/16" (26.98)
Collets – Hex (max. capacity)	29/32" (23.01)
Collets – Square (max. capacity)	3/4" (19.05)
Step Chucks – Regular Depth	up to 4" (101.6)
Step Chucks – Extra Depth	up to 4" (101.6)
Sure-Grip® Expanding Collets	1/8" - 3" (3.17 - 76.2)
3-Jaw Manual Chuck	5" (127)
3-Jaw Manual Chuck	6" (152.4
3-Jaw Sure-Grip® Power Chuck	4" (101.6)
Fixture Plate – Collet Style	3 3/8" (85.72)
Fixture Plate – Collet Style	4 3/8" (111.12)
Slotted Face Plate (diameter)	6.3" (160)
Collet Stops for part positioning	YES

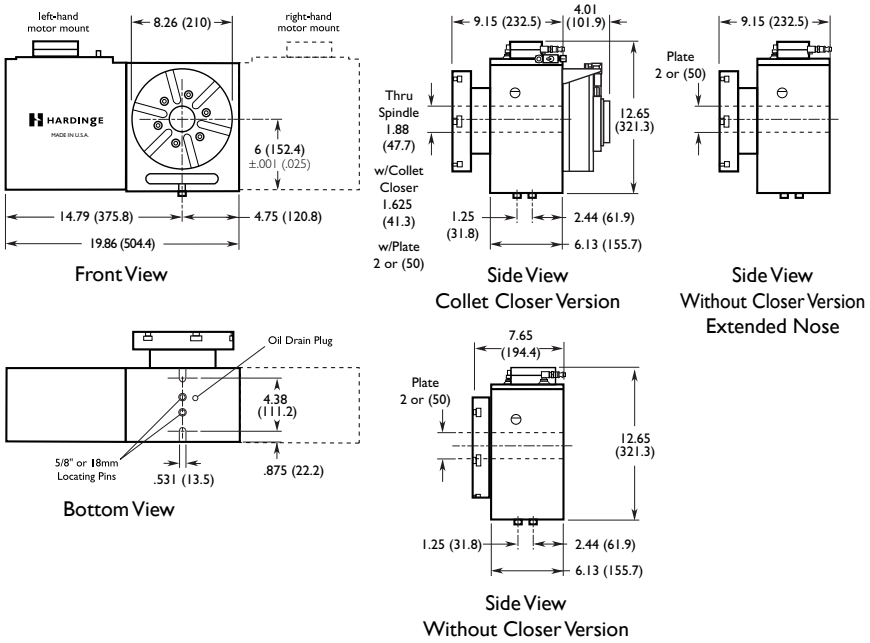
Workholding Capacities
GD210LP

Collets – Round (max. capacity)	1 5/8" (41.27)
Collets – Hex (max. capacity)	1 13/32" (35.71)
Collets – Square (max. capacity)	1 9/64" (28.97)
Step Chucks – Regular Depth	up to 6" (152.4)
Step Chucks – Extra Depth	up to 6" (152.4)
FlexC Collet System - Style D	2 9/16" (65.00)
3-Jaw Chucks (diameter)	5", 6", 8"
Sure-Grip® Expanding Collets	
Collet Style	1/2" - 4" (12.70 - 101.6)
Spindle Style	1/8" - 4" (3.17 - 101.6)
Fixture Plates	
Spindle Mount	5 1/2" (139.70)
Spindle Mount	8 7/8" (225.42)
Collet Style	6 3/8" (161.92)
Slotted Face Plate	8.26" (210)
Slotted Face Plate	8 7/8" (225.42)
Slotted Face Plate	10" (254)
Collet Stops for part positioning	YES

GD160LP Dimensions:



GD210LP Dimensions:



(millimeters in parentheses)

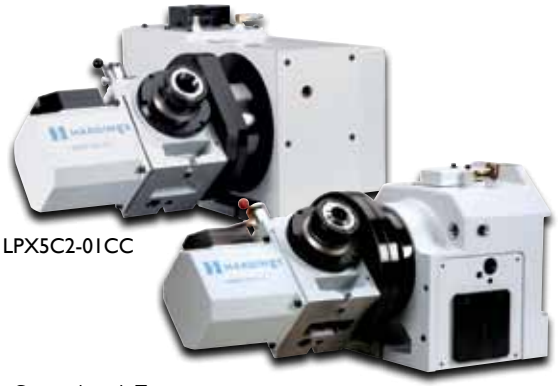
Hardinge collet-ready spindles accept collets, expanding collets and step chucks with the use of an optional collet closer.

HARDINGE GROUP

www.shophardinge.com

Tilting Dual-Axis, Single and Multi-spindle Rotary Indexers

Add efficiency to your table with dual-axis, multiple part machining and flexible part gripping options. Eliminate the need for second or third operations or expensive fixturing. Accepts standard collets, Sure-Grip® expanding collets, step chucks, jaw chucks and face or fixture plates in the 5C spindles.



LPX5C2-01CC

GDX5C2

Standard Features

Single-Spindle:

- 5th-axis base unit has a total 360° tilt (±180° from the 12-o'clock position)
- Adjustable hardware limit switches to limit travel to reduce risk of possible crash included when purchased with Servo Control (limit switch not available on LPX5C2-01CC with a collet closer)
- Units are precision aligned to the spindle center
- Two units in one – quick release for separate use of indexers (do not disassemble multiple-spindle models)

Multi-Spindle Configurations:

- Robust dual-bearing trunnion support
- Dual pneumatic clamp system for increased rigidity
- 5" (127) spindle center-to-center
- Pneumatic collet closers
- Overall Trunnion length:

dual	32.24" (819)
triple	37.24" (946)
quad	42.25" (1073)

All Configurations:

- 5C threaded-nose spindle accepts standard collets, step chucks, expanding collets and jaw chucks
- Operate with servo control boxes – GDX5C2 will also operate as 4th-axis connection, tilt only
- Single, dual, triple and quad spindle configurations

Optional Features

Multi-Spindle Configurations:

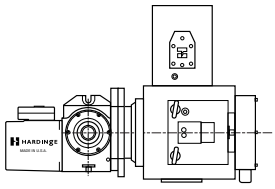
- Adjustable hardware limit switches to limit travel to reduce risk of possible crash (using control box only)
- Two individual servo controls are required for operation (capable of 4th- or 4th- & 5th-axis interfacing on some machines)
- Manual drawbar turns by hand for reduced-cost option

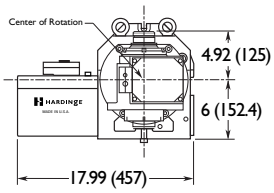
SERVO CONTROL / PROGRAMMING	4th-Axis 5C Spindles	Tilting 5th-Axis
Servo Model	Standard Servo	
Storage - Number of programs/steps	up to 50/1000	
RS-232 Interface	YES	
Text Display	multiple lines	
Infrared Upload/Download	YES	
Baud Rate Capacity	up to 56K	
SPINDLE		
Runout Maximum (TIR)	0.0002" (.005)	
Backlash	40 arc-sec	40 arc-sec
Maximum RPM Rapid Min-1	60	10
Load Support – max. part weight	Dual Bearing 17.6 lb / 8 kg	Dual Bearing
Spindle Type	2 3/16 – 10 threaded nose	A2-5
Collets	Standard 5C	—
Table Height at Collet Nose	12.62" (320.5)	—
Spindle center to base	7.25" ± 0.001 (184.2 ±.0254) (90°)	7.25" ± 0.001 (184.2±.0254)
POSITIONING		
Tilting Range	—	-180° to +180°
Accuracy [6]	±25 arc-sec	±15
Repeatability	±5 arc-sec	
Max Rotation/Step (degree)	9999.99 [7]	±180.00
Minimum Increment	.001	
Gear Diameter	2.8" (71.1)	6.2" (157.0)
MOTOR		
Clamping System	—	Pneumatic
Clamping Torque [2]	—	(single) 275 ft-lb / 373 Nm (multi) 550 ft-lb / 745 Nm
Working Torque at Spindle [3]	(single) 54 ft-lb / 73 Nm (multi) 34 ft-lb / 46 Nm	130 ft-lb / 176 Nm
Duty Cycle	90% at full speed	
OPERATING SPECIFICATIONS		
Speed Reduction Ratio	60:1	90:1
Operating Temp. (maximum ambient)	104°F / 40°C	
Power Requirements (VAC)	115 +/- 5% @ 10 amps	
Max Air Pressure	120 psi / 8.3 bar	
WEIGHT		
Single Spindle	265 lb / 120 kg	
Dual Spindle	460 lb / 208 kg	
Triple Spindle	525 lb / 238 kg	
Quad Spindle	590 lb / 268 kg	
Control – standard or enhanced	9.54 lb / 4.34 kg	

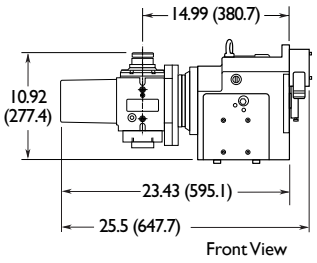
Notes: 2 – maximum torque applied before slipping occurs
3 – from standard GE Fanuc H104 amplifier (results vary when using servo control box or 220V power source)
6 – accuracies can be improved with electronic compensation
7 – continuous rotation available

GDX5C2
LPX5C2-01
LPX5C2-02
LPX5C2-03
LPX5C2-04

GDX5C2 Dimensions:

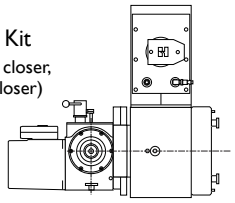


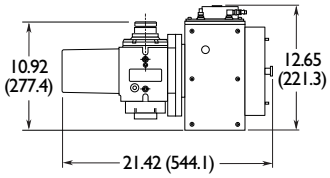




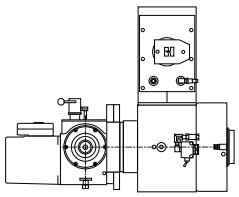
LPX5C2-01LS with Limit Switch Kit

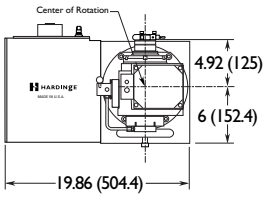
(GD5C2 with collet closer, GD210LP without closer)

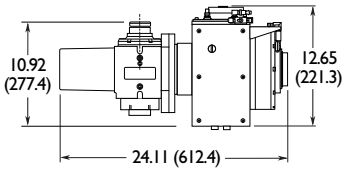




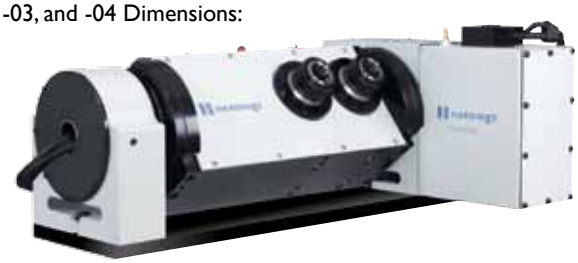
LPX5C2-01CC with Collet Closers (no limit switch kit)

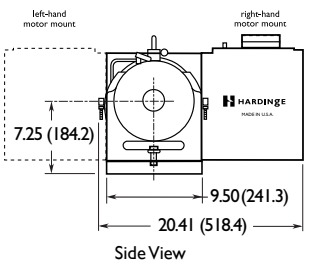


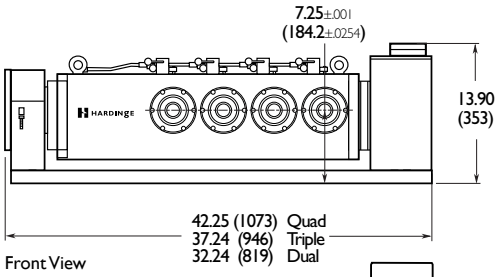




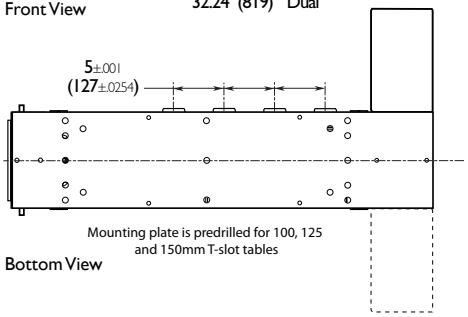
LPX5C2-02, -03, and -04 Dimensions:







Dimensions are for units operated via Hardinge servo control. Dimensions will vary for units operated via fourth axis.



(millimeters in parentheses)

Workholding Capacities

Collets – Round (max. capacity)	1 1/16" (26.98)
Collets – Hex (max. capacity)	29/32" (23.01)
Collets – Square (max. capacity)	3/4" (19.05)
Step Chucks – Regular Depth	up to 6" (152.4)
Step Chucks – Extra Depth	up to 6" (152.4)
3-Jaw Chuck	5" (127)
3-Jaw Chuck	6" (152.4)
Sure-Grip® Expanding Collets	1/8" - 3" (3.17 - 76.2)
Fixture Plate – Spindle Mount	3" (76.2)
Fixture Plate – Spindle Mount	5" (127)
Fixture Plate – Collet Style	3 3/8" (85.72)
Fixture Plate – Collet Style	4 3/8" (111.12)
Collet Stops for part positioning	YES

(Multi-spindle units limited by 5" (127) spindle-to-spindle centers)

HARDINGE GROUP™

www.shophardinge.com

Direct-Drive, Super-Precision® Rotary Table Indexers

Hardinge's state-of-the-art direct-drive technology brings you features that give you a competitive advantage. The zero backlash permits rapid bi-directional movement without loss of time used to compensate for position over-travel, which means more time in the cut. Set your shop apart from the others with flexible, high-speed, super-precision parts positioning.

Standard Features

- Rugged cross roller bearing for high moment loads with super rigidity
- Full use of high-speed machining and machine's "look-ahead" programming
- Direct-drive torque motor
  - No mechanical gearing, fewer parts to wear
  - Zero backlash, high servo stiffness
  - Rapid bidirectional response
  - Wraparound motor for smaller footprint
  - Super-precision positioning

DD100 A2-4 5C high-speed positioner is ideal for drill & tap and laser processing:

- Up to 4,200° per second speed
- Accepts standard 5C tooling
- Operate with the Hardinge all-digital servo control or interface to your machine

DD200 and DD300 rotary table indexers include a spindle clamp and slotted face plate:

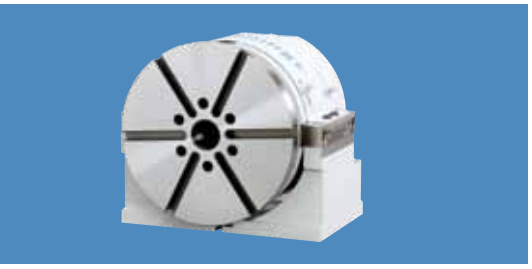
- Accepts standard A2-5 16C tooling
- The DD200 can operate with the Hardinge direct-drive servo control or interface to your machine – the DD300 is 4th-axis only
- Thermal isolation mounting arms with a cast iron base provide uniform heat dissipation to hold the centerline of the spindle constant

Options

- Collet Closers (see page 20)
  - DD100 - manual, fail-safe or high-force
  - DD200/DD300 - pneumatic
  - Manual drawbar
- A spindle clamp is optional for DD100
- Tailstocks, plate and cube trunnions (DD100 plate trunnion only)
- Interface cable can be mounted on the left- or right-hand side

	DD100	DD200	DD300
SERVO CONTROL / PROGRAMMING			
Servo Model	Direct-Drive Servo		4th-axis only
Storage - No. of programs/steps	up to 50/1000		4th-axis only
RS-232 Interface	YES		4th-axis only
Text Display	multiple lines		4th-axis only
Infrared Upload/Download	YES		4th-axis only
Baud Rate Capacity	up to 56K		4th-axis only
SPINDLE			
Runout Maximum (TIR)	0.0002" (.005)	0.0002" (.005)	0.0002" (.005)
Backlash	0	0	0
Speed with Servo Control	0.001 to 4,200°/sec	0.001 to 2,100°/sec	
Maximum RPM {servo}	600[5] {450/700[2]}	250[5] {175/350[6]}	250[5]
Load Support	Cross roller bearing	Cross roller bearing	Cross roller bearing
Maximum Part Weight	92 lb / 42 kg	215 lb / 97 kg	230 lb / 104 kg
Spindle Type	A2-4	A2-5	A2-5
Collet-type Work Handling	Standard 5C	Standard 16C	Standard 16C
Spindle center to base	4.000" ± 0.001 (101.6 ±.0254)	6.000" ± 0.001 (152.4±.0254)	7.000" ± 0.001 (177.8±.0254)
POSITIONING			
Accuracy	±3 arc-sec	±3 arc-sec	±3 arc-sec
Repeatability	±2 arc-sec	±2 arc-sec	±2 arc-sec
Resolution	.001 degrees	.001 degrees	.001 degrees
Max Rotation/Step (degree)	CONTINUOUS	CONTINUOUS	99999.999
Gear Diameter	NO GEAR	NO GEAR	NO GEAR
MOTOR (rare-earth permanent magnet torque motor)			
Clamping Torque [1]	100 ft-lb / 136 Nm (option)	275 ft-lb / 373 Nm	275 ft-lb / 373 Nm
Maximum Torque	28 ft-lb / 38 Nm	118 ft-lb / 160 [5] Nm	245 ft-lb / 332 [5] Nm
Continuous Air-Cooled [3]	3.8 ft-lb / 5 Nm	27 ft-lb / 37 [5] Nm	68 ft-lb / 92 [5] Nm
Continuous Water-Cooled [3]	7.5 ft-lb / 10 Nm	56 ft-lb / 76 [5] Nm	131 ft-lb / 177 [5] Nm
Duty Cycle	100%	100%	100%
OPERATING SPECIFICATIONS			
Gear Ratio (worm & gear)	NO GEAR	NO GEAR	NO GEAR
Operating Temp. (max. ambient) [7]	176°F / 80°C	176°F / 80°C	176°F / 80°C
Power Requirements (VAC) [4]	115 +/- 5% @10 amps	varies	varies
Maximum Air Pressure	80 psi / 5.5 bar	120 psi / 8.3 bar	120 psi / 8.3 bar
Minimum Air Pressure	N/A	85 psi / 5.8 bar	85 psi / 5.8 bar
WEIGHT			
Rotary System	65 lb / 29.4 kg	203 lb / 92 kg	345 lb / 156.6 kg
Control	9.54 lb / 4.34 kg	9.54 lb / 4.34 kg	4th-Axis only

Notes: 1 – maximum torque applied before slipping occurs
2 – 450 @120V / 700 @230V Single Phase
3 – continuous torque available 24/7, 365 days
4 – will vary according to motor requirements of 4th-axis interface
5 – from standard GE Fanuc H104 amplifier
6 – 175 @120V / 350 @230V Single Phase
7 – liquid cooled



DD100
DD200
DD300

Workholding Capacities DD100

Collets – Round (max. capacity)	1 1/16" (26.98)
Collets – Hex (max. capacity)	29/32" (23.01)
Collets – Square (max. capacity)	3/4" (19.05)
Step Chucks – Regular Depth	up to 4" (101.6)
Step Chucks – Extra Depth	up to 4" (101.6)
Sure-Grip® Expanding Collets	
Collet Style	1/8" - 3" (3.17-76.2)
Fixture Plate – Collet Style	3 3/8" (85.72)
Fixture Plate – Collet Style	4 3/8" (111.12)
Slotted Face Plate	170mm
Collet Stops for part Positioning	YES

Workholding Capacities DD200

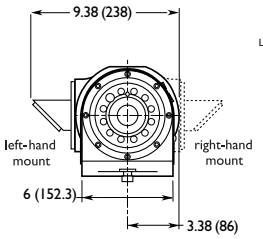
Collets – Round (max. capacity)	1 5/8" (41.27)
Collets – Hex (max. capacity)	1 13/32" (35.71)
Collets – Square (max. capacity)	1 9/64" (28.97)
Step Chucks – Regular Depth	up to 6" (152.4)
Step Chucks – Extra Depth	up to 6" (152.4)
FlexC Collet System - Style D	2 9/16" (65.00)
3-Jaw Chucks	5", 6", 8"
Sure-Grip® Expanding Collets	
Collet Style	1/2" - 4" (12.7-101.6)
Spindle Style	1/8" - 4" (3.1 -101.6)
Fixture Plate – Spindle Mount	5 1/2" (139.70)
Fixture Plate – Spindle Mount	8 7/8" (225.42)
Fixture Plate – Collet Style	6 3/8" (161.92)
Slotted Face Plate	225, 254mm
Collet Stops for part positioning	YES

Workholding Capacities DD300

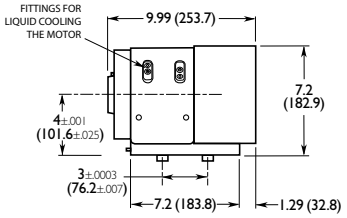
Collets – Round (max. capacity)	1 5/8" (41.27)
Collets – Hex (max. capacity)	1 13/32" (35.71)
Collets – Square (max. capacity)	1 9/64" (28.97)
Step Chucks – Regular Depth	up to 6" (152.4)
Step Chucks – Extra Depth	up to 6" (152.4)
FlexC Collet System - Style D	2 9/16" (65.00)
3-Jaw Chucks	5", 6", 8", 10"
Sure-Grip® Expanding Collets	
Collet Style	1/2" - 4" (2.7-101.6)
Spindle Style	1/8" - 4" (3.17-101.6)
Fixture Plate – Spindle Mount	5 1/2" (139.7)
Fixture Plate – Spindle Mount	8 7/8" (225.42)
Fixture Plate – Collet Style	6 3/8" (161.92)
Slotted Face Plate	225, 254, 305mm
Collet Stops for part positioning	YES

HARDINGE GROUP™

DD100 Dimensions:

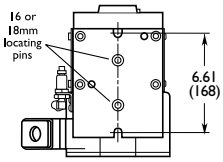


Front View

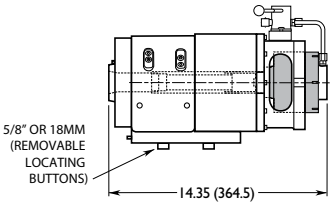


Side View without Collet Closer

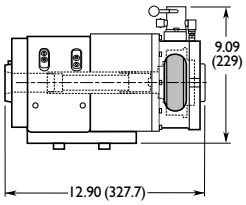
Interface cable can be mounted on the left- or right-hand side of the spindle



Bottom View

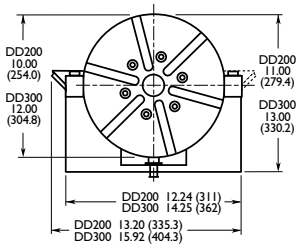


Side View with High-Force Collet Closer

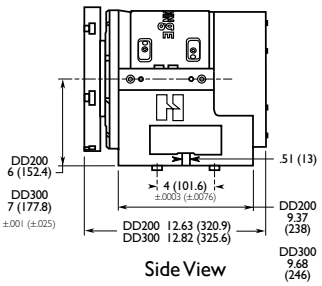


Side View with Fail-Safe Collet Closer

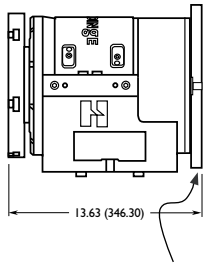
DD200 and DD300 Dimensions:



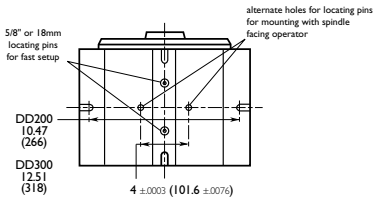
Front View



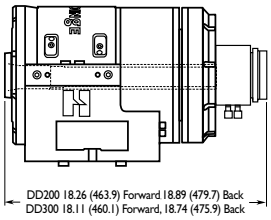
Side View without Collet Closer



Optional Mounting Plate less collet closer for DD200 only (placing unit on its back)


5/8" or 18mm locating pins for fast setup
alternate holes for locating pins for mounting with spindle facing operator
DD200 10.47 (266)
DD300 12.51 (318)
4 ±.0003 (101.6 ±.0076)

Bottom View



Side View with Pneumatic Collet Closer

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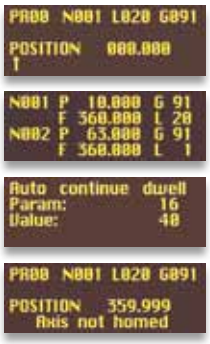
All-Digital Servo Controls



The Hardinge all-digital servo controls are current generation, easy to use and will support either brush or brushless indexers. A multi-line display reduces scrolling and user manual dependency. Connect via a standard interface cable or use the RS-232 port. Upload and download your programs via a pocket PC using the built-in infrared capability.

Standard Servo Control

- Used with GD5C2 Indexers

Enhanced Servo Control

- Used with GD16C2, GD3J2, GD160LP and GD210LP Rotary Table Indexers
- Advanced G-code programming supports hardware and software limit switches and clamping
- Three additional inputs and outputs support external 24V accessories
- CE and CSA approved for worldwide use

Direct-Drive Servo Control

- Used with DD100 and DD200 Rotary Table Indexers
- Advanced G-code programming supports hardware and software limits switches and clamping
- Three additional inputs and outputs support external 24V accessories
- Air intake and output
- 120V or 240V capacity

SERVO CONTROL PROGRAMMING FEATURES	
AUTOMATIC CIRCLE DIVISION	You can program a step that automatically divides a circle into any number of equal parts between 2 and 9999.99
CONTINUOUS ROTATION CAPABLE	Continuous rotation with no limit to the number of revolutions through G-code function
STOP	You can use the STOP to feed-hold spindle movement without losing position on restart
FAST SET-UPS	All connectors are "quick-disconnect", ensuring fast and easy set-ups
INTERFACING	Most CNC mills can be interfaced quickly and easily by using a spare M function which provides a switch-closer as a signal between your mill and the control
LINEAR & SPIRAL MILLING	For semi fourth-axis capability
MEMORY	A nonvolatile memory retains your program even when power is turned off
PROGRAM STORAGE	Store and recall from up to fifty different programs
PROGRAMMABLE PARAMETERS	You can alter many of the basic features by performing your own basic programming
PROGRAMMING	Program to rotate the spindle clockwise or counter-clockwise with step sizes from .001 to 9999.99 degrees
ABSOLUTE OR INCREMENTAL PROGRAMMING	Up to 1000 different steps can be stored in memory and each step can be repeated (looped) 999 times
RS-232 INTERFACE	For computer control of sending and receiving programs and running RS-232 commands from machine
RESOLUTION	Standard resolution of .001 degrees
SIMPLE EDITING	Edit a program by simply writing over existing steps, or inserting or deleting a line (or several lines) between steps, with automatic program line renumbering
SUBROUTINES	Allows you to repeat sequences up to 999 times saving programming time and memory space
VARIABLE FEED RATES	Variable from .001 deg/sec to 2150 deg/sec (limited by indexer model)
ZERO RETURN	An "automatic home" position can be programmed to return the spindle to its original starting position from any point

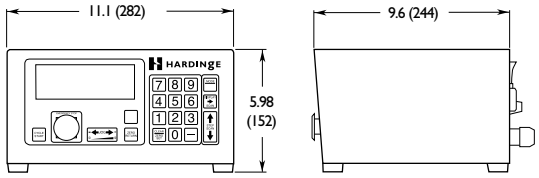
Standard Servo Control
Enhanced Servo Control
Direct-Drive Servo Control

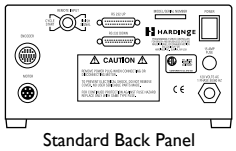
Standard Features

- Support either brush or brushless motor indexers made by Hardinge and other rotary system manufacturers
- Store up to 50 programs with up to 1000 steps in each program
- Multiple line LCD display will allow you to view the program number, step number, loop count and preparatory code without scrolling
- Intelligent power module (drive electronics) to bring the best possible system to your machining center or knee mill
- Parameter number as well as its definition can be viewed in logical English
- Error and fault messages can be displayed to help diagnose problems
- Hardinge servo controls use hardware rather than software to detect feedback faults, resulting in faster fault detection
- Computer processing speed is six times faster than others on the market
- Baud rates up to 56k supporting the latest speeds for sending and receiving data
- RS- 232 interface allows data entry, upload, download, read position, start and stop motor operation – and allows remote diagnostics and troubleshooting
- Communication parameters can be adjusted to support stop bits, data bits and different baud rates to work with different machine tool brands
- Memory is nonvolatile so that the program content is fully captured and will be maintained after power off conditions
- Infrared sensor capability allows you to send/receive programs from a Pocket PC (available from Hardinge)

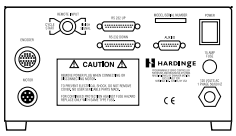
HARDINGE GROUP

Standard and Enhanced
Servo Control Dimensions:



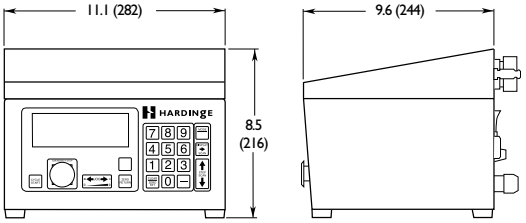


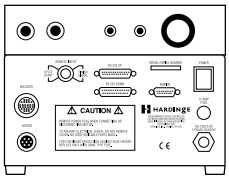
Standard Back Panel



Enhanced Back Panel

Direct-Drive
Servo Control Dimensions:





Direct-Drive Back Panel

(millimeters in parentheses)

Horizontal mount
tilting stationary shelf

Vertical mount
tilting swivel shelf

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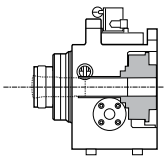
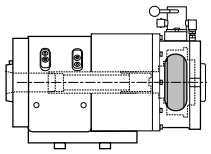
Collet Closer and Tailstock Options

GD5C2 and DD100 Pneumatic Fail-Safe Collet Closers

- Spring-close, air-to-open for fail-safe operation (85psi max)
- Part remains clamped even if loss of air should occur
- Non-adjustable grip force



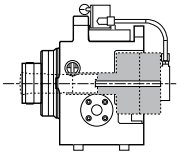
GD5C2 pneumatic fail-safe collet closer



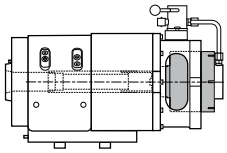
DD100 pneumatic fail-safe collet closer

GD5C2 and DD100 Pneumatic High-Force Collet Closers

- Dual cylinder for greater resulting force
- Set force according to levels below the maximum allowed for the workholding system



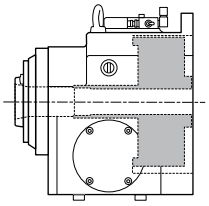
GD5C2 pneumatic high-force collet closer [1]



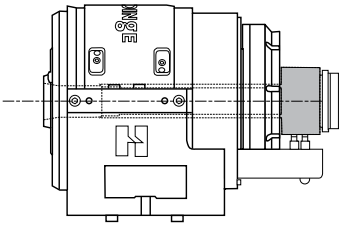
DD100 pneumatic high-force collet closer [1]

GD16C2, GD3J2, DD200 and DD300 Pneumatic Collet Closers

- Dual cylinder
- Set force according to levels below the maximum allowed for the workholding system
- Accepts power chucks



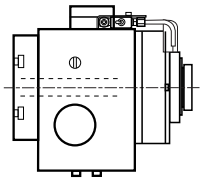
GD16C2 and GD3J2 pneumatic collet closer



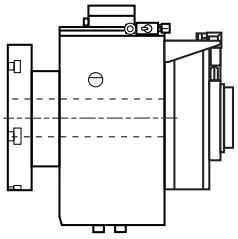
DD200 & DD300 pneumatic collet closer

GD160LP and GD210LP Pneumatic Collet Closer

- Air open and air close actuation
- Enough stroke for power chuck use



GD160LP pneumatic collet closer



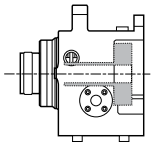
GD210LP pneumatic collet closer

GD5C2 Manual Collet Closer

- Manual lever open and close

Manual Drawbar

- Individual drawbar turns in by hand for low-cost option



GD5C2 manual collet closer

for multi-spindle 5C[2] units, DD100, DD200 and DD300

All collet closers have a through-hole to accommodate through coolant, while some can accommodate long parts. Valving is included with pneumatic collet closers when purchased with indexer.

ROTARY	COLLET CLOSER	DRAWBAR FORCE @70 PSI / 4.8 BAR	THRU HOLE	STROKE	MOUNTING PLATE [1]
GD5C2	Manual (lever-operated)	950 lb / 431 kg	1.18" (30.00)	.125" (3.1)	N/A
GD5C2	Pneumatic Fail-Safe [2]	1760 lb / 798 kg	1.08" (27.43)	.060" (1.5)	N/A
GD5C2	Pneumatic High Force	1950 lb / 885 kg	.311" (7.90)	.060" (1.5)	required
DD100	Pneumatic Fail-Safe [2]	1760 lb / 798 kg	1.00" (25.40)	.060" (1.5)	N/A
DD100	Pneumatic High Force	1950 lb / 885 kg	.311" (7.90)	.060" (1.5)	required
GD16C2	Pneumatic	4560 lb / 2068 kg	1.62" (41.275)	.625" (15.8)	N/A
GD3J2	Pneumatic	4560 lb / 2068 kg	1.75" (44.450)	.625" (15.8)	N/A
GD160LP	Pneumatic	1825 lb / 828 kg	1.08" (27.432)	.375" (9.5)	N/A
GD210LP	Pneumtic	2792 lb / 1266 kg	1.625" (41.30)	.625" (15.8)	N/A
DD200	Pneumatic	2400 lb / 1088 kg	1.68" (42.80)	.625" (15.8)	N/A
DD300	Pneumatic	2400 lb / 1088 kg	1.68" (42.80)	.625" (15.8)	N/A

Notes: 1– mounting plate required for using the rotary unit in a vertical on-end position
2 – 85 psi / 5.8 bar maximum drawbar force for fail-safe collet closers

(millimeters in parentheses)

Hardinge tailstocks are designed to be used where extra support is needed for either workpiece or fixture holding. Workpieces that have a length-to-diameter ratio of greater than 3-to-1 are candidates for a tailstock support. This is especially true when attempting to achieve high accuracy levels. Choose from manually- or pneumatically-operated tailstocks.

Manual Tailstock

- Manually-operated quill-type tailstock with convenient hand wheel – 1/4-turn quill lock
- #3 Morse taper spindle
- Only live centers are recommended for use
- Base locating pins to reference and configure with any Hardinge Rotary System
- Riser plate is supplied for all rotary devices with spindle centerline above 4" (101.6)

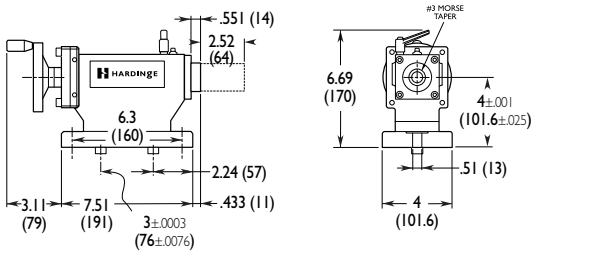
Pneumatic Tailstock

- Allows greater level of cell automation and reduces operator fatigue
- #3 Morse taper spindle
- Only live centers are recommended for use
- May be operated from a host CNC machine tool via M-code or by the operation of a convenient hand valve
- Large actuator diameter produces higher forces than competitor's brands
- Riser plate is supplied for all rotary devices with spindle centerline above 4" (101.6)
- Pneumatic valving included

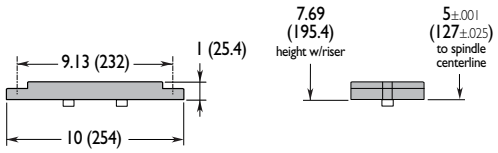
HARDINGE GROUP™

Manual Tailstock

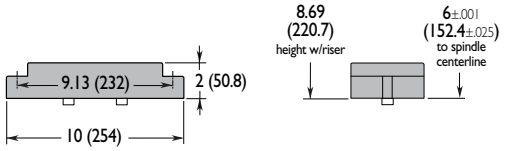
for GD5C2 and DD100



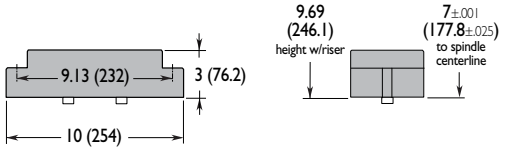
1" Tailstock Riser included for GD160LP



2" Tailstock Riser included for GD16C2, GD3J2, GD210LP, DD200

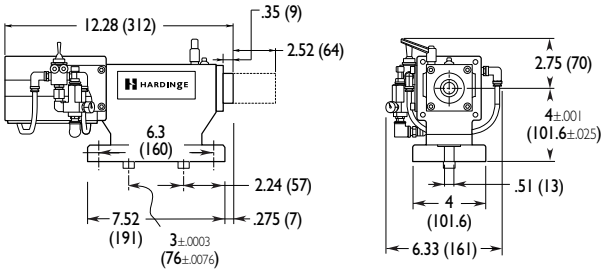


3" Tailstock Riser included for DD300

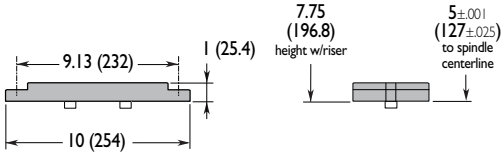


Pneumatic Tailstock

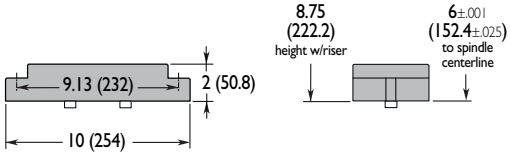
for GD5C2 and DD100



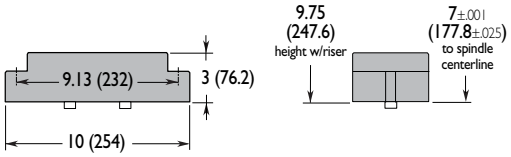
1" Tailstock Riser included for GD160LP



2" Tailstock Riser included for GD16C2,GD3J2, GD210LP, DD200



3" Tailstock Riser included for DD300



(millimeters in parentheses)

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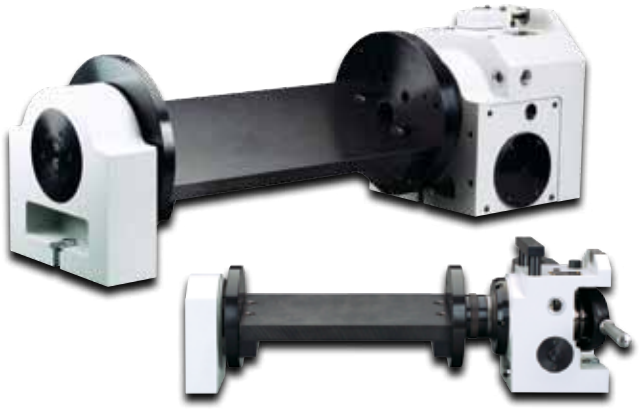
Plate and Cube Trunnion Accessories

Imagine the possibilities for multiple part processing…

- low-profile clamping
- window box fixturing for 4-sided machining
- toggle and saddle clamping
- collet blocks



Custom manufacturing available

Standard Features

- Bearing pillow block assures rigid, accurate positioning and will accommodate heavy loads
- Multiple part fixturing for increased output
- Load up a second plate to maximize cutting time
- All parts can be machined efficiently with the same tool before going to the next tool
- Plates provide two sides for fixturing, while the cube provides four sides
- 360° revolution depending on part clearance required
- Can be field installed to existing rotary units
- Plates are of blackened steel and the cube is of solid aluminum for ease of drilling and slotting according to the application requirements, either by Hardinge or by the customer
- One-inch pillow block riser included for use with DD300 rotary table indexer
- Custom manufacturing available

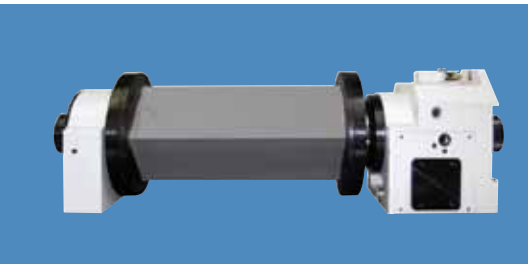
Optional Features

- Pillow block clamp available on PTA25 and CTA25 models with clamping torque of 275 ft-lb / 373 Nm
- Rotary union in pillow block for pneumatic fixturing on the cube trunnion – part number CJ 0002483CTA
- Complete line of collet blocks available for gripping round, hex, square and odd-shaped parts using collet sizes from 1C up to 35J

ROTARY DEVICE COMPATIBILITY	PT5C 5C PLATE	PTA25 A2-5 PLATE	CTA25 A2-5 CUBE
GD5C2	YES		
Centerline	4" (101.6)	NO	NO
Overall Length	23.80" (607)		
DD100	YES		
Centerline	4" (101.6)	NO	NO
Overall Length	28.82 (732)		
GD160LP	YES		
Centerline	5" (127.0)	NO	NO
Overall Length	23.48 (596)		
GD16C2		YES	YES
Centerline	NO	6" (152.4)	6" (152.4)
Overall Length		37.54" (954)	37.48" (952)
GD210LP		YES	YES
Centerline	NO	6" (152.4)	6" (152.4)
Overall Length		31.04" (788.3)	32.07" (814.7)
DD200		YES	YES
Centerline	NO	6" (152.4)	6" (152.4)
Overall Length		37.68 (957)	37.63(956)
DD300		YES	YES
Centerline	NO	7" (177.8)	7" (177.8)
Overall Length		37.87 (962)	37.82 (961)

(millimeters in parentheses)

Collet Blocks



PT5C2
PTA25
CTA25-4IN
CTA25-6IN

Plate Trunnion PT5C2

- 4 x 10" (101.6 x 254) machineable area on two surfaces
- Adjustable centerline to accommodate various part heights
- Collet-style face plate draws in to the 5C spindle nose of the rotary product
- 1" riser* required for GD160LP

Plate Trunnion PTA25

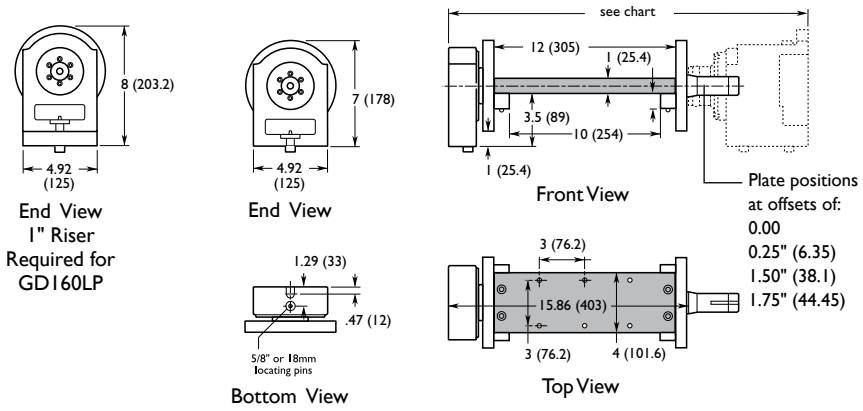
- 7 x 16.73" (177.8 x 425) machineable area on two surfaces
- Adjustable centerline to accommodate various part heights
- Face plate bolts on to the A2-5 spindle nose of the rotary product
- 1" riser* required for DD300

Cube Trunnion CTA25

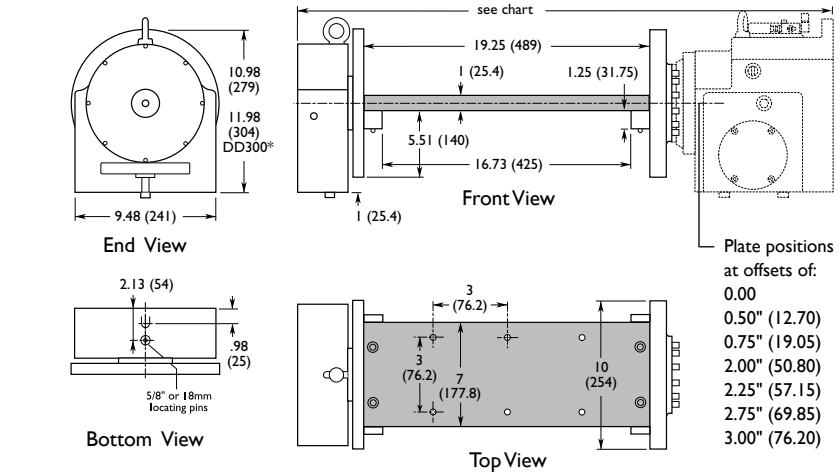
- 18" (457mm) long solid aluminum block for four-sided machining applications
- Available in 4" and 6" cubes
- 1/8" NPT ports to accommodate air-actuated workholding
- Face plate bolts on to the A2-5 spindle nose of the rotary product
- Can easily be configured for highly productive 2D work
- 1" riser* required for DD300

HARDINGE GROUP

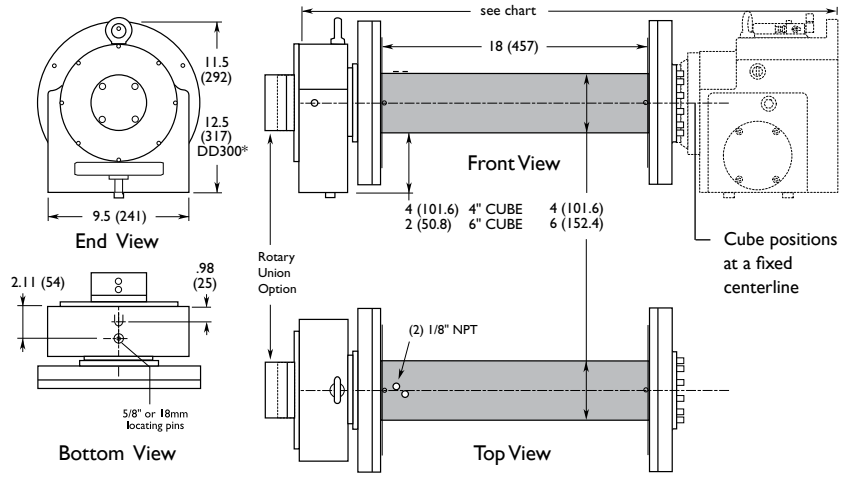
PT5C2 Tilting Plate Trunnion for GD5C2, GD160LP and DD100 Rotary Units – Dimensions:



PTA25 Tilting Plate Trunnion for GD16C2, GD3J2, GD210LP, DD200 and DD300 Rotary Units Dimensions:



CTA25-4IN and CTA25-6IN Tilting Cube Trunnions for GD16C2, GD3J2, GD210LP, DD200 and DD300 Rotary Units Dimensions:



(millimeters in parentheses)

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Workholding Options

Hardened and Ground Collets

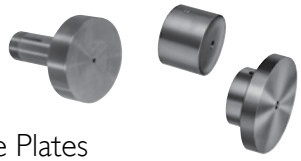
- Manufactured to exacting standards from special alloy steel
- Threads are heat treated and body is spring tempered to assure accuracy and durability at low cost
- Wide range of standard sizes and shapes (and some not so standard) "off-the-shelf"
- Round, hex, rectangular, square and emergency collets (ready to bore)
- 5C, 16C and 3J

16C-to-5C Spindle Adapter

- Mounts on A2-5 spindle rotary unit to enable the use of standard 5C tooling

Sure-Grip® Expanding Collet Systems

- Mount directly into the collet seat of the spindle
- Solid, one-piece body and arbor combination with a minimum of parts required to expand the collet
- Expanding arbor instantly locates on center, unlike other designs
- Quick collet changeover
- Wide gripping range for each collet
- True parallel gripping with a high gripping force
- 5C, 16C and 3J



Fixture Plates

- Used to mount parts which cannot be held with a collet or jaw chuck
- Clamping method to be designed, manufactured and balanced by the customer
- Collet and spindle-mount styles available

Step Chucks

- Accurately hold work up to, or larger than, 6" (152.4) diameter
- Castings, moldings, stampings and machined parts are held rigidly and accurately
- Tubing can be held without crushing or distortion
- Regular-Depth Step Chucks are ⅜" larger in diameter than the rated size so the full capacity may be readily applied to a depth of ½"
- Extra-Depth Step Chucks are made so the full rated capacity may be applied to a depth of 1¼"
- Small closing angles available on step chucks for non-rotating use
- A step chuck closer is required for all rotating spindle applications – mounts directly on the spindle nose
- An inside taper corresponding to that on the step chuck places the closing pressure over the stepped area of the chuck, resulting in greater gripping power and accuracy
- Emergency Step Chucks are supplied with pin holes and pins in place for precision just-in-time machining
- 5C, 16C and 3J

HARDINGE®

Collets and Sure-Grip® Expanding Collets
Step Chucks and FlexC™ Collet Systems
Manual and Power Chucks
Face and Fixture Plates

Slotted Face Plates

- Precision ground in sizes to fit all rotary units

FlexC™ Vulcanized Collet Systems

- A2-5 Spindle mount style
- .0004" (.010mm) concentricity
- Round, hex, square and emergency styles
- ±.020 (.5mm) gripping range will accommodate stock variation
- 1/4 to 29/16" 65mm capacity
- 7/32 to 15/8" 42mm capacity

Sure-Grip® 3-Jaw Power Chucks

- Lever-operated, counter-centrifugal and dynamically balanced to maintain jaw force
- Testing indicates a mechanical advantage over wedge-style chucks
- Accuracy and repeatability up to .0005" (.0127mm) for 4" to 8" chucks

* Linkup and/or adapter required – please specify indexer model at time of order.

Manual Jaw Chucks

- 5" / 6" 3-jaw and 4-jaw, 8" and 10" 3-jaw styles
- 5C threaded-nose style for GD5C2 indexer
- A2-5 spindle mount styles
- 3-Jaw universal and 4-jaw independent draw

Product Description	GD5C2	GD16C2	GD3J2	GD160LP	GD210LP	DD100	DD200	DD300
Spindle	5C threaded-nose	A2-5 16C	A2-5 3J	A2-4	A2-5	A2-4 5C	A2-5	A2-5
FlexC Collet System (Style D)	—	V65-5D00500*	V65-5D00500*	—	V65-5D00500*	—	V65-5D00500*	V65-5D00500*
4" Power Chuck	—	—	—	SCA-2000304-A24H	—	—	—	—
5" Power Chuck	—	SCA-2000305-A25H	SCA-2200305-A25C*	—	SCA-2000305-A25H	—	SCA-2000305-A25H	SCA-2000305-A25H
6" Power Chuck	—	SCA-2000306-A25H	SCA-2300306-A25C*	—	SCA-2000306-A25H	—	SCA-2000306-A25H	SCA-2000306-A25H
8" Power Chuck	—	SCA-2000308-A25H	O/A	—	SCA-2000308-A25H	—	SCA-2000308-A25H	SCA-2000308-A25H
10" Power Chuck	—	O/A	O/A	—	O/A	—	O/A	O/A
5" 3-Jaw Universal Manual Chuck	53B-5405-HB D	—	—	—	—	—	—	—
5" 4-Jaw Independent Manual Chuck	54B-5405-HB D	—	—	—	—	—	—	—
6" 3-Jaw Universal Manual Chuck	63B-5405-HB D	—	63B-5405-BCA5	—	63B-5405-BCA5	63B-5405-BCA4	63B-5405-BCA5	63B-5405-BCA5
6" 4-Jaw Independent Manual Chuck	64B-5405-HB D	—	64B-5405-BCA5	—	64B-5405-BCA5	64B-5405-BCA4	64B-5405-BCA5	64B-5405-BCA5
8" 3-Jaw A2-5 Manual Chuck	—	83A-5405	83A-5405	—	83A-5405	—	83A-5405	83A-5405
10" 3-Jaw A2-5 Manual Chuck	—	13-5405	13-5405	—	13-5405	—	13-5405	13-5405
3" Spindle-mount Fixture Plate	53A-0008750-D	—	—	—	—	—	—	—
5" Spindle-mount Fixture Plate	55A-0008750-D	—	—	—	—	—	—	—
5 1/2" Spindle-mount Fixture Plate	—	A2-0008750-05	A2-0008750-05	—	A2-0008750-05	—	A2-0008750-05	A2-0008750-05
8 7/8" Spindle-mount Fixture Plate	—	A2-0008750-08	A2-0008750-08	—	A2-0008750-08	—	A2-0008750-08	A2-0008750-08
3 3/8" Collet-style Fixture Plate	1397-00-00	—	—	1397-00-00	—	1397-00-00	—	—
4 3/8" Collet Style Fixture Plate	1399-00-00	—	—	1399-00-00	—	1399-00-00	—	—
6 3/8" Collet-style Fixture Plate	—	1785-00-00	—	—	1785-00-00	—	1785-00-00	1785-00-00
210mm Slotted Face Plate (50mm thru)	—	—	—	—	CJ 1990200M	—	—	—
8.26" Slotted Face Plate (2" thru hole)	—	—	—	—	CJ 1990200E	—	—	—
170mm Slotted Face Plate (19mm thru)	—	—	—	—	—	RT 0007214A4	—	—
160mm Slotted Face Plate (25mm thru)	—	—	—	LI 0001990160M	—	—	—	—
6.229" Slotted Face Plate (1" thru hole)	—	—	—	LI 0001990160E	—	—	—	—
7" Slotted Face Plate (.437mm thru)	57A-0000692-D	—	—	—	—	—	—	—
8 7/8" Slotted Face Plate (.437mm thru)	—	A2 0000692-A9	A2 0000692-A9	—	A2 0000692-A9	—	A2 0000692-A9	A2 0000692-A9
10" Slotted Face Plate (1.5" thru hole)	—	CJ 000199020	CJ 000199020	—	CJ 000199020	—	CJ 000199020	CJ 000199020
12" Slotted Face Plate (2" thru hole)	—	RT 000690009**	RT 000690009	—	RT 000690009**	—	RT 000690009**	RT 000690009
Spindle Adapter 16C-to-5C	—	CJ 00002835CA	—	—	CJ 00002835CA	—	CJ 00002835CA	CJ 00002835CA

* Linkup and/or adapter required – please specifiy indexer model. ** Riser Plate recommended

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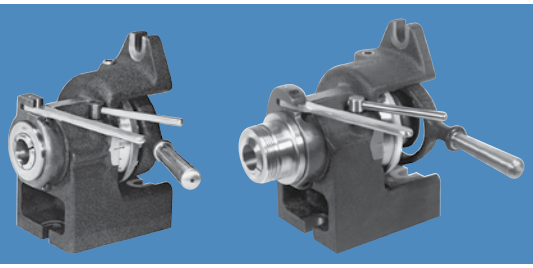
Manual Index and Inspection Fixtures



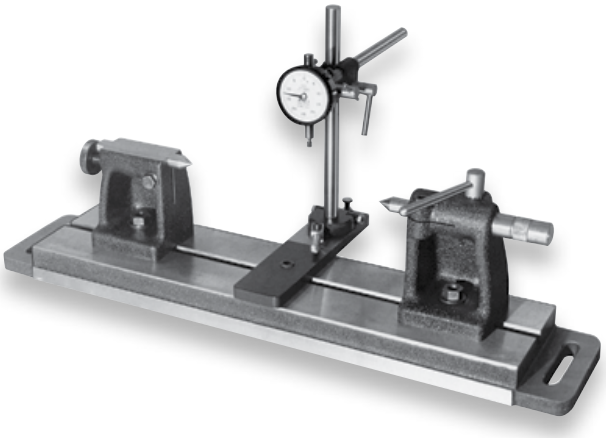
Manual index fixtures are used in both production and toolroom environments as a low cost, quick and accurate means of holding a workpiece and performing indexing operations. The tapered or threaded-nose spindles are hardened and ground. They accept all standard 5C collets, step chucks with closers, expanding collets, Dead-Length® collets and manual jaw chucks.

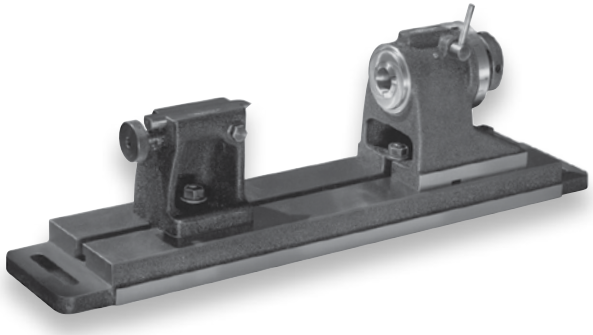
Manual Indexer	Part Number	Figure page 27
HV-4 [A] with Plain Spindle and 24-Hole Index Plate	HV-0000002-P4	1
HV-4N [A] with Threaded-Nose Spindle and 24-Hole Index Plate	HV-0000002-D4	1
HV-4NX [A] with Taper-Nose Spindle and 24-Hole Index Plate	HV-0000002-T4	1
H-4 [B] with 24-Hole Index Plate	HF-0000002-24	2
Index Plates	**Part Number**	**Figure page 27**
Blank Index Plate for HV Models	HV-9004138	3
20-Hole Index Plate for HV Models	HV-0004138-2A	4
24-Hole Index Plate for HV Models	HV-0004138-4A	5
Blank Index Plate for H-4 Model	HF-9004138	6
20-Hole Index Plate for H-4 Model	HF-0004138-20	7
24-Hole Index Plate for H-4 Model	HF-0004138-24	8

A - Used in horizontal or vertical positions.
B - Used in horizontal position only.

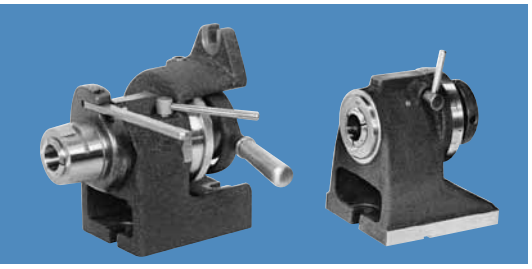
Tailstocks and Inspection Fixtures

- The SB-4 Sub-Base with the tailstocks can be used as a bench center
- The L-4 Tailstock has a hardened and ground spindle which is lever-operated with a rack and pinion
  - Spindle is spring loaded to hold the center against the workpiece
  - Position lock is provided
- The hardened and ground spindle on the T-4 Tailstock is screw fed and can be locked in any position with a hexagon clamp bolt
  - Removable keys permit the tailstocks to be applied directly to any machine table
- SB-4 Sub-Base accepts various combinations of fixtures such as the HV and H-4 series of indexing fixtures





Tailstocks and Sub-Base	Part Number	Figure
L-4 Tailstock with Rapid Movement Lever	HV-0000056	9
T-4 Tailstock with Screw Adjustment	HF-0000056	10
SB-4 Sub-Base	HV-0001996-A	11



HV-4
HV-4N
HV-4NX
H-4

Manual Indexer Standard Features

- Choice of spindle nose
  - HV-4 plain
  - HV-4N threaded nose
  - HV-4NX taper nose
  - H-4 24-hole index plate only
- Includes 24-hole index plate
- HV models can be used horizontal or vertical

Optional Features

- Blank index plates
- 20-hole index plates
- 24-hole replacement index plates

Workholding Capacities

(threaded and taper nose indexers only)

Collets – Round (max. capacity)	$1^{1}/_{16}$" (26.98)
Collets – Hex (max. capacity)	$^{29}/_{32}$" (23.01)
Collets – Square (max. capacity)	$^{3}/_{4}$" (19.05)
Step Chucks – Regular Depth	up to 6" (152.4)
Step Chucks – Extra Depth	up to 6" (152.4)
3-Jaw Chuck	5" (127)
3-Jaw Chuck	6" (152.4)
Sure-Grip® Expanding Collets	$^{1}/_{8}$" - 3" (3.17 - 76.2)
Fixture Plate – Spindle Mount	3" (76.2)
Fixture Plate – Spindle Mount	5" (127)
Fixture Plate – Collet Style	$3^{3}/_{8}$" (85.72)
Fixture Plate – Collet Style	$4^{3}/_{8}$" (111.12)
Slotted Face Plate (diameter)	7" (178)
Collet Stops for part positioning	YES

Figure 1
HV-4, HV-4N, HV-4NX
Dimensions:

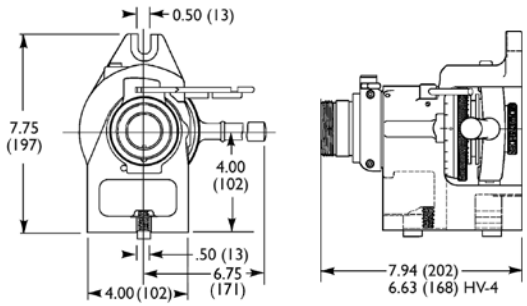
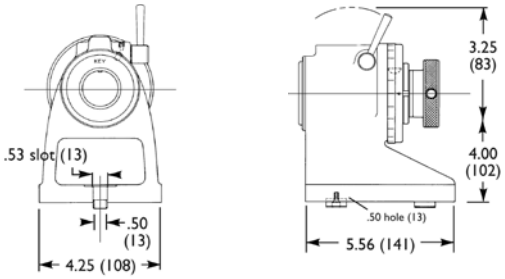
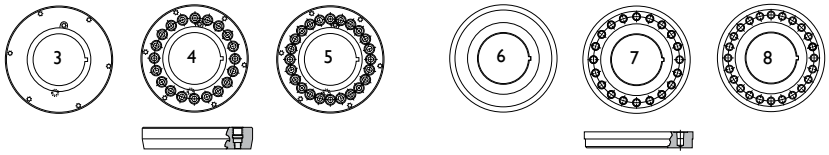


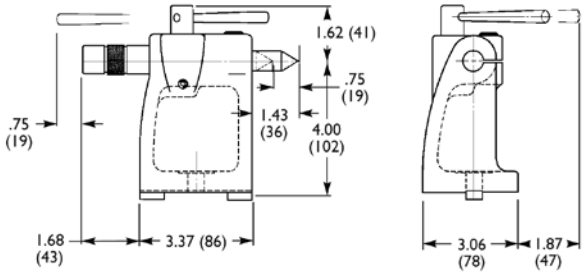
Figure 2
H-4 Dimensions:



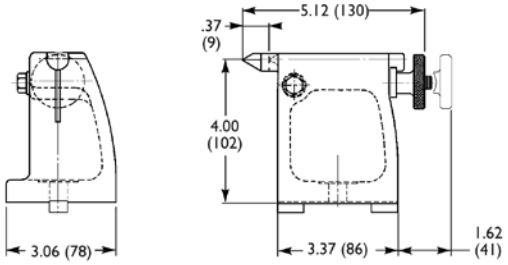
Figures 3 - 8 Indexer Plate Configurations:



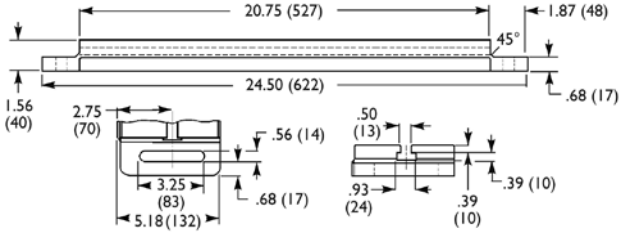
Figures 9
L-4 Dimensions:



Figures 10
T-4 Dimensions:



Figures 11
SB-4 Dimensions:



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